DESIGN A WIDEBAND LOW-NOISE AMPLIFIER FOR WIRELESS COMMUNICATION USING 0.35-\(\mu\)m CMOS TECHNOLOGY

By

MOHD HAFIZ BIN ABU

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Of the requirements for the degree
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By the name of Allah, The Most Merciful. All praises due to Him, Lord of all worlds.

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APPROVAL AND DECLARATION SHEET
This project report titled Design A Wideband Low Noise Amplifier for Wireless Communication Using 0.35-um CMOS Technology was prepared and submitted by Mohd. Hafiz Bin Abu (Matrix Number: 031030257) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Electronic Engineering) in Universiti Malaysia Perlis (UniMAP).

Checked and Approved by

_______________________
(SITI ZARINA MD. NAZIRI)
Project Supervisor

School of Microelectronic Engineering
Universiti Malaysia Perlis

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MERKABENTUK PENGUAT RENDAH HINGAR JALUR LEBAR UNTUK KEGUNAAN WAYARLES MENGGUNAKAN TEKNOLOGI CMOS 0.35-um.
DESIGN A WIDEBAND LOW-NOISE AMPLIFIER FOR WIRELESS COMMUNICATION USING 0.35-µm CMOS TECHNOLOGY

ABSTRACT

Low Noise Amplifier (LNA) is one of the receiver front end component. Place near antenna, this part used to minimize the noise figure of the amplifier while providing enough gain with sufficient linearity to overcome the noise of subsequent stage. It is commonly used to amplify signal that are too weak for direct processing for example in radio and cable receiver. For this project, some specification to design Low Noise Amplifier are picked from Digital Enhanced Cordless Telecommunication (DECT) specification. During designing the amplifier, the characteristic of the low-noise amplifier has been studied. Thus, the core amplifier of the low noise amplifier consist of simple common source transconductance structure for the first stage and the second stage used common source amplifier with active shunt-shunt feedback. The advantage by using the feedback structure is the amplifier reduce effect of noise that occur and reduce non-linear distortion as the output proportional with the input. The design of the Low Noise Amplifier used Mentor Graphic software by using 0.35tsmc (Taiwan Semiconductor Manufacturing Company) for design and simulation process. At the end of the process, layout of the Low Noise Amplifier has been produce and ready to be fabricated at clean room.
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LIST OF ABBREVIATION

IC            Integrated Circuit
VLSI       Very Large Scale Integration
µ            Mobility of charge
L            Effective channel length

\( \left( \frac{W}{L} \right) \)  Aspect ratio

\( V_{TH} \)  Voltage threshold

\( C_{ox} \)  Total capacitance per unit length

\( g_m \)  Transconductance

\( \psi_o \)  Junction built in potential

\( V_{db} \)  Reverse voltage across the junction

NF            Noise Factor